



BEKASI-EAST JAKARTA AIRPORT AIR SIDE

Report

Degree: Master's degree in Aerospace Engineering **Course:** 220304 - Airports design and construction

Delivery date: 10-12-2017

Students: Abiétar Moreno, Sergi; Delgado Chicote, Miguel; Fernández Porta, Sergi;

Fernández Sanz, Sergio; Fontanes Molina, Pol and Vidal Pedrola, Xavier



Contents

Lis	st of	lables		V
Lis	st of	Figures	3	vi
1	Airp	ort loc	ation and characterization	1
	1.1	Locati	on	1
	1.2	Meteo	rology	1
		1.2.1	Temperature	1
		1.2.2	Wind	1
2	Run	way de	sign	2
	2.1	Introd	uction	3
	2.2	Runwa	ay length	3
		2.2.1	Runway length for reference aircraft	3
		2.2.2	Final runway length	3
	2.3	Runwa	y width	3
		2.3.1	Runway width for reference aircraft	3
		2.3.2	Final runway width	3
	2.4	Refere	nce code	3
	2.5	Declar	ed distances	3
	2.6	Protec	tion and safety areas	3
		2.6.1	Runway shoulders	3
		2.6.2	Runway strips	3
		2.6.3	Runway end safety area (RESA)	3
		2.6.4	Stopway (SWY)	3
		2.6.5	Clearway (CWY)	3
3	Taxi	way de	esign	4
	3.1	Introd	uction	5
	3.2	Taxiwa	ay width $\ldots\ldots\ldots\ldots\ldots\ldots$	5
	3.3	Taxiwa	ay turns	5
	3.4	Taxiwa	ay overwidths (sobreanchos)	5
	3.5	Taxiwa	ay shoulders	5

CONTENTS



	3.6	Taxiway strips	5
	3.7	Rapid exit taxiways	5
		3.7.1 Introduction	5
		3.7.2 Number of rapid exit taxiways	5
		3.7.3 Design of rapid exit taxiways	5
	3.8	Holding positions	5
		3.8.1 Introduction	5
		3.8.2 Minimum distance between holding position and runway	5
		3.8.3 Interference with critical and ILS sensible areas	5
		3.8.4 Interference with CWY and physical obstacles	5
		3.8.5 Separation between aircraft (guardas entre aeronaves)	5
		3.8.6 Final design of holding positions	5
4	Holo	ling positions	E
-	4.1	.	6
	4.2	Minimum distance between holding position and runway	
	4.3	•	6
	4.4		6
			6
	4.5		6
5	A nw	on design	7
J	5.1		7
	5.1	Apron taxiways	
	5.2		
	5.5		7
		5.3.1 General dimensions of aircraft stands	
	E 4		7
	5.4	No equipment and holding equipment areas	-
	5.5	Apron trajectories	-
	5.6	Service ways in apron	
	5.7	Terminal connections	7
6		kings	8
	6.1	, ,	ç
		6.1.1 Runway centerline markings	ç
		6.1.2 Runway side strip markings	ç
		6.1.3 Runway threshold markings	ç
		6.1.4 Runway Idesignation marking	ç
		6.1.5 Runway aiming point markings	ç
		6.1.6 Runway touchdown zone markings	Ĉ
	6.2	Taxiway markings	Ç

CONTENTS



	8.1	Manda	tory instruction signs
8	Sign	S	12
		7.3.3	Visual guidancd system for parking
		7.3.2	Projector based apron lighting
		7.3.1	Line and edge apron lights
	7.3	Apron	
	7.2	7.2.6	Intermediate holding point lights
		7.2.5	Stop bar lights
		7.2.4	Taxiway edge lights
		7.2.3	Taxiway light for a rapid exit taxiway
		7.2.2	Taxiway lights for an exit taxiway
		7.2.1	, 6
	7.2		ny lights
	7.0	7.1.8	Runway rapid exit lights
		7.1.7	Touchdown zone lights
		7.1.6	Runway end lights
		7.1.5	Runway threshold and wing bar lights
		7.1.4	Runway edge lights
		7.1.3	Runway threshold identification lights
		7.1.2	Approach slope indication systems
		7.1.1	Approach lights
	7.1		y lights
7	Ligh		10
7			
		6.3.9	Service way markings
		6.3.8	Aircraft stand markings
		6.3.7	Aircraft stop line markings
		6.3.6	Stand safety line markings
		6.3.5	Equipment parking line markings
		6.3.4	Stand lead in line for multiple useable parking stands
		6.3.3	End of aircraft movement area markings
		6.3.2	Apron boundary markings
		6.3.1	Apron lead in line markings
	6.3	Apron	markings
		6.2.6	Mandatory instruction marking
		6.2.5	Runway entry holding position markings
		6.2.4	Intermediate holding position markings
		6.2.3	Taxiway holding position markings
		6.2.2	Taxiway strip markings
		6.2.1	Taxiway centerline markings

CONTENTS



	8.2	Information signs	12
9	High	-voltage electrical system	13
	9.1	Electrical system general design	13
	9.2	Connection sub-stations	13
	9.3	Electric powerplant	13
	9.4	Electrical transformation center	13
	9.5	Channeling and distribution of the electrical system $\ldots \ldots \ldots \ldots$	13
10	Med	ium voltage electrical system	14
	10.1	Beacon circuits	15
		10.1.1 Runway centerline lighting system	15
		10.1.2 Taxiway centerline lighting system	15
		10.1.3 Runway and taxiway centerlines lighting system	15
		10.1.4 Approach lighting system	15
		10.1.5 Touchdown zone lighting system	15
		10.1.6 Runway header lighting system	15
		10.1.7 RETIL electrical circuit	15
		10.1.8 PAPI electrical circuit	15
		10.1.9 Stop bar electrical circuit	15
		10.1.10 Signs electrical circuit	15
	10.2	Regulation chambers	15
	10.3	Wire channeling	15
11	Aero	onautical limitation surfaces	16
	11.1	Physical limitation surfaces	16
	11.2	ILS limitation surfaces	16
	11.3	Localizer limitation surfaces	16
	11.4	Gliding trajectory protection limitation surfaces	16
12	Bibli	ography	17



List of Tables

AIR SIDE R - v



List of Figures

AIR SIDE R - vi



1 | Airport location and characterization

- 1.1 Location
- 1.2 Meteorology
- 1.2.1 Temperature
- 1.2.2 Wind





2 Runway design

\mathbf{a}	4				. •
2.		Int	·ro	יוור	tion
- .	_			auc	LIUII

- 2.2 Runway length
- 2.2.1 Runway length for reference aircraft
- 2.2.2 Final runway length
- 2.3 Runway width
- 2.3.1 Runway width for reference aircraft
- 2.3.2 Final runway width
- 2.4 Reference code
- 2.5 Declared distances
- 2.6 Protection and safety areas
- 2.6.1 Runway shoulders
- 2.6.2 Runway strips
- 2.6.3 Runway end safety area (RESA)

AIR SIDE 2.6.4 Stopway (SWY)

R - 3

2.6.5 Clearway (CWY)





3 | Taxiway design

3.1	Introduction
3.2	Taxiway width
3.3	Taxiway turns
3.4	Taxiway overwidths (sobreanchos)
3.5	Taxiway shoulders
3.6	Taxiway strips
3.7	Rapid exit taxiways

- 3.7.1 Introduction
- 3.7.2 Number of rapid exit taxiways
- 3.7.3 Design of rapid exit taxiways
- 3.8 Holding positions
- 3.8.1 Introduction
- 3.8.2 Minimum distance between holding position and runway AIR SIDE $\rm R 5$
- 3.8.3 Interference with critical and ILS sensible areas
- 3.8.4 Interference with CWY and physical obstacles



4 | Holding positions

- 4.1 Introduction
- 4.2 Minimum distance between holding position and runway
- 4.3 Interference with critical and ILS sensible areas
- 4.4 Interference with CWY and physical obstacles
- 4.4.1 Separation between aircraft (guardas entre aeronaves)
- 4.5 Final design of holding positions



5 Apron design

- 5.1 Introduction
- 5.2 Apron taxiways
- 5.3 Aircraft stands
- 5.3.1 General dimensions of aircraft stands
- **5.3.2** Dimensions for reference aircraft
- 5.3.3 Aircraft stands organization
- 5.4 No equipment and holding equipment areas
- 5.5 Apron trajectories
- 5.6 Service ways in apron
- **5.7 Terminal connections**



R - 8



6 Markings

0.1	Runway markings
6.1.1	Runway centerline markings

- 6.1.2 Runway side strip markings
- 6.1.3 Runway threshold markings
- 6.1.4 Runway Idesignation marking
- 6.1.5 Runway aiming point markings
- 6.1.6 Runway touchdown zone markings

6.2 Taxiway markings

- 6.2.1 Taxiway centerline markings
- 6.2.2 Taxiway strip markings
- 6.2.3 Taxiway holding position markings
- 6.2.4 Intermediate holding position markings
- 6.2.5 Runway entry holding position markings
- 6.2.6 Mandatory instruction marking

AIR SIDE

R - 9





7 | Lights

1.1 Runway lights	7.1	Runway	lights
-------------------	-----	--------	--------

- 7.1.1 Approach lights
- 7.1.2 Approach slope indication systems
- 7.1.3 Runway threshold identification lights
- 7.1.4 Runway edge lights
- 7.1.5 Runway threshold and wing bar lights
- 7.1.6 Runway end lights
- 7.1.7 Touchdown zone lights
- 7.1.8 Runway rapid exit lights

7.2 Taxiway lights

- 7.2.1 Taxiway lights
- 7.2.2 Taxiway lights for an exit taxiway
- 7.2.3 Taxiway light for a rapid exit taxiway
- 7.2.4 Taxiway edge lights



8 | Signs

- 8.1 Mandatory instruction signs
- 8.2 Information signs



9 High-voltage electrical system

- 9.1 Electrical system general design
- 9.2 Connection sub-stations
- 9.3 Electric powerplant
- 9.4 Electrical transformation center
- 9.5 Channeling and distribution of the electrical system



AIR SIDE R - 14



10 | Medium voltage electrical system

1	0.	1	Beacon	circ	uite
•	١J.		Dealth		

- 10.1.1 Runway centerline lighting system
- 10.1.2 Taxiway centerline lighting system
- 10.1.3 Runway and taxiway centerlines lighting system
- 10.1.4 Approach lighting system
- 10.1.5 Touchdown zone lighting system
- 10.1.6 Runway header lighting system
- 10.1.7 RETIL electrical circuit
- 10.1.8 PAPI electrical circuit
- 10.1.9 Stop bar electrical circuit
- 10.1.10 Signs electrical circuit

10.2 Regulation chambers

10.3 Wire channeling



11 | Aeronautical surfaces

limitation

- 11.1 Physical limitation surfaces
- 11.2 ILS limitation surfaces
- 11.3 Localizer limitation surfaces
- 11.4 Gliding trajectory protection limitation surfaces



12 | Bibliography